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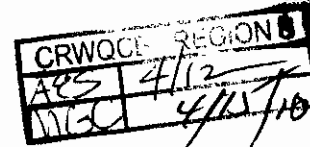
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ORANGE COUNTY WATER DISTRICT

April 8, 2009

Maneck G. Chichgar
 Santa Ana Regional Water Quality Control Board
 3737 Main Street, Suite 500
 Riverside, CA 92501



APR 12 2009



Subject: OCWD Review of the February 2, 2010 Interim Status Update for Pilot Test of Groundwater Recirculation Well with In-casing Oxidation, Former Y-12 Facility, 301 East Orangethorpe Avenue, Anaheim, CA

Dear Mr. Chichgar:

Orange County Water District (OCWD) staff has reviewed the February 2, 2010 Interim Status Update for Pilot Test of Groundwater Recirculation Well with In-casing Oxidation at the former Northrop Y-12 Facility at 301 East Orangethorpe Avenue in Anaheim, CA (prepared by Orion Environmental, Inc.). The District has serious concerns regarding the viability of the pilot test and, moreover, adverse impacts to the aquifer due to its continued operation. Our comments and concerns are provided below.

1. Baseline sampling conducted on 10/20/09 indicates the TCE and PCE concentrations of 18.9 and 58.9 ug/L, respectively, in the lower screened interval. Given concentrations of these constituents well in excess of their State and Federal Primary Maximum Contaminant Levels (MCL), the recirculation well is not designed to remediate VOCs in the lower part of the Shallow Aquifer. In fact, it could exacerbate the problem by injecting water into the lower part of the Shallow Aquifer, pushing the contamination and accelerating its off-site migration.

Along those lines, the Interim Status Update states that pilot test is achieving the objectives described in the February 29, 2009 Work Plan. The remedial objectives include, "Minimizing negative impacts on groundwater or aquifer chemistry." It is clear that the pilot test is not meeting this objective.

2. During start-up testing on October 20, 2009, using only ozone and at the higher pumping rate of 130 gpm, PCE concentrations in the lower screened interval were consistently more than double the 24 ug/L PCE baseline concentration in the upper screened interval. This demonstrates that the lower casing sampling point is too low and not strictly collecting a sample of

the treated water originating from the upper screened interval. This concern was raised in our December 3, 2009 letter regarding the pilot test work plan.

3. Bromate, a likely by product of oxidation using ozone, was not analyzed. The State and Federal Primary MCL for bromate is 10 µg/L. As previously noted in our December 3, 2009 letter, the potential formation of bromate at concentrations that exceed MCLs should be evaluated, particularly given the injection of the treated water in the deeper part of the Shallow Aquifer and in an area where groundwater migrates downward into the Principal Aquifer.
4. The Interim Status Update does not discuss the capture zone for the upper screened interval. Significant heterogeneity is observed within the relatively small pilot test area. This is exemplified by the changes in lithology of the screened intervals of monitoring wells 17A/B/C, 16A/B/C and 15A/B/C, located 25, 75 and 150 feet from the recirculation well, respectively, as summarized below:

Depth of Screened Interval (ft bgs)	Lithology within Monitoring Well Screened Intervals		
110 – 125	MW-15A: Fine to medium sand	MW-16A: Fine sand	MW-17A: Clay with sand, and clayey sand
140 – 150	MW-15B: Sand with gravel	MW-16B: Fine to coarse sand	MW-17B: Poorly graded coarse sand
185 – 190	MW-15C: Medium to coarse sand with gravel, and fine silty sand	MW-16C: Fine to medium sand	MW-17C: Silty fine sand, and poorly graded fine to medium sand

The zone of capture in the upper part of the Shallow Aquifer should be measured. Given the heterogeneity of the aquifer underlying the site, it should not be assumed that the width of the capture zone for the upper screened interval is equivalent to width of the injected water bubble in the lower screened interval.

5. Other site monitoring wells exhibit considerably higher TCE and/or PCE concentrations than those in wells CW-1, MW-15A/B/C, MW-16A/B/C, and MW-17A/B/C. Examples are as follows:

	Maximum Concentration 12/22/08 – 9/21/09	
	TCE (µg/l)	PCE (µg/l)
"Upper Aquifer" Monitoring Wells		
NMW-1	100	42

(screened 110-125 ft bgs)		
NMW-2 (screened 110-125 ft bgs)	480	100
"Perched Aquifer" Monitoring Wells		
NMW-2A (screened 85-95 ft bgs)	370	110
NMW-5A (screened 85-95 ft bgs)	91	38
NMW-7A (screened 80-90 ft bgs)	510	54

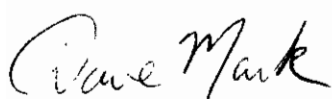
With baseline concentrations at the test recirculation well significantly lower than concentrations observed in other areas of the site, the pilot test does not evaluate the efficacy of that treatment technology within the range of known on-site conditions. Where higher VOC concentrations are five to ten times higher than the influent of the test recirculation well, the pumping rate of a recirculation well receiving these higher concentrations would likely have to be reduced considerably, which would significantly reduce its zone of influence.

6. In monitoring well MW-16A, hexavalent chromium is present in the upper part of the Shallow Aquifer at concentrations more than double the MCL for total chromium. Total chromium concentrations in that monitoring well are nearly three times the MCL. Use of a recirculation well in areas with elevated chromium concentrations will result in the spreading of that contaminant deeper into the aquifer. Clearly, this would not be acceptable.

Because the pilot test is injecting water into the lower part of the aquifer and accelerating the off-site migration of VOCs with concentrations exceeding ten times MCLs, OCWD staff recommends immediate termination of the pilot test and destruction or modification to the recirculation wells to preclude flow through well. Site conditions are not compatible with this technology, rendering it fatally flawed at that location. The District recommends implementing other conventional remedial methods to provide groundwater remediation and containment of elevated VOC contamination in groundwater.

Please do not hesitate to call me if you have any questions (714-378-3337).

Sincerely,



Dave Mark, P.G., C.H.G.
Orange County Water District